Draft TMDL Action Plans

Board of Supervisors Environmental Committee

Department of Public Works and Environmental Services

Working for You!

A Fairfax County, VA, publication
February 7, 2017

Glossary of Acronyms

- DEQ – Department of Environmental Quality
- EPA – Environmental Protection Agency
- FCPS – Fairfax County Public Schools
- LA – Load Allocation
- MOS – Margin of Safety
- MOU – Memorandum of Understanding
- MS4 – Municipal Separate Storm Sewer System
- POC – Pollutant of Concern
- PCBs – Polychlorinated Biphenyls
- TMDL – Total Maximum Daily Load
- TN – Total Nitrogen
- TP – Total Phosphorus
- TSS – Total Suspended Solids (a.k.a. Sediment)
- VDOT – Virginia Department of Transportation
- WLA – Wasteload Allocation
- WIP – Watershed Implementation Plan
- WMP – Watershed Management Plan
- WQS – Water Quality Standards

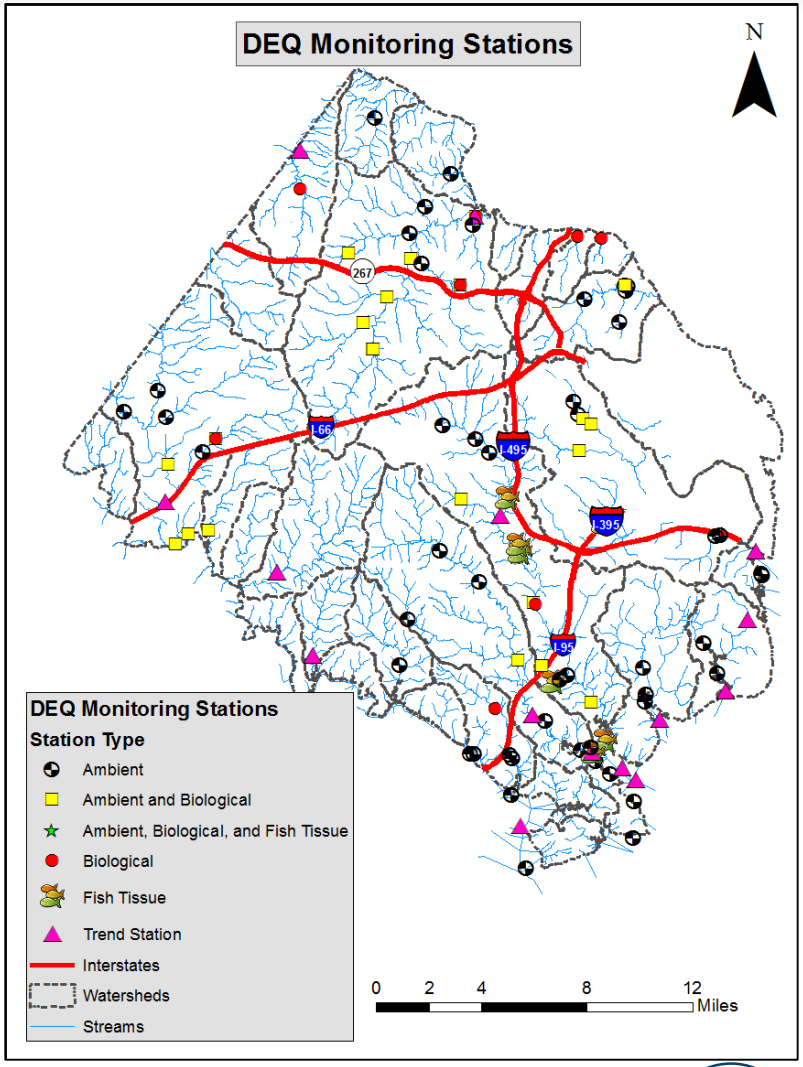
Agenda

- Water Quality Protection and Restoration
  - Approved TMDLs in Fairfax County
  - MS4 Permit Overview
  - TMDL Action Plans
- Draft TMDL Action Plans
  - Chesapeake Bay TMDL Action Plan
  - Sediment TMDL Action Plan
  - Bacteria TMDL Action Plan
  - PCB TMDL Action Plan
- Public Comments and Next Steps

Water Quality Protection and Restoration

Virginia's Water Quality Monitoring, Information and Restoration Act (§ 62.1-44.19:4 et seq.) Requires DEQ to:

- Monitor and assess surface water quality
- Identify surface waters that do not meet WQS
  - Impaired waters
- Develop plans to address impaired waters
  - TMDL = LA + WLA + MOS
  - WLAs implemented through permits



Approved TMDLs in Fairfax County

- Nitrogen, Phosphorus and Sediment (TN, TP and TSS)
  - Chesapeake Bay (countywide)
- Sediment (Benthic Stressor)
  - Difficult Run
  - Bull Run (includes Cub Run, Little Rocky Run, and Johnny Moore Creek)
  - Popes Head Creek
- Bacteria (fecal coliform and/or *Escherichia coli*)
  - Difficult Run
  - Four Mile Run
  - Hunting Creek, Cameron Run, and Holmes Run
  - Accotink Creek
  - Popes Head Creek, Bull Run, and the Occoquan River
- PCBs
  - Tidal Potomac River (direct drainage areas)

MS4 Permit Overview

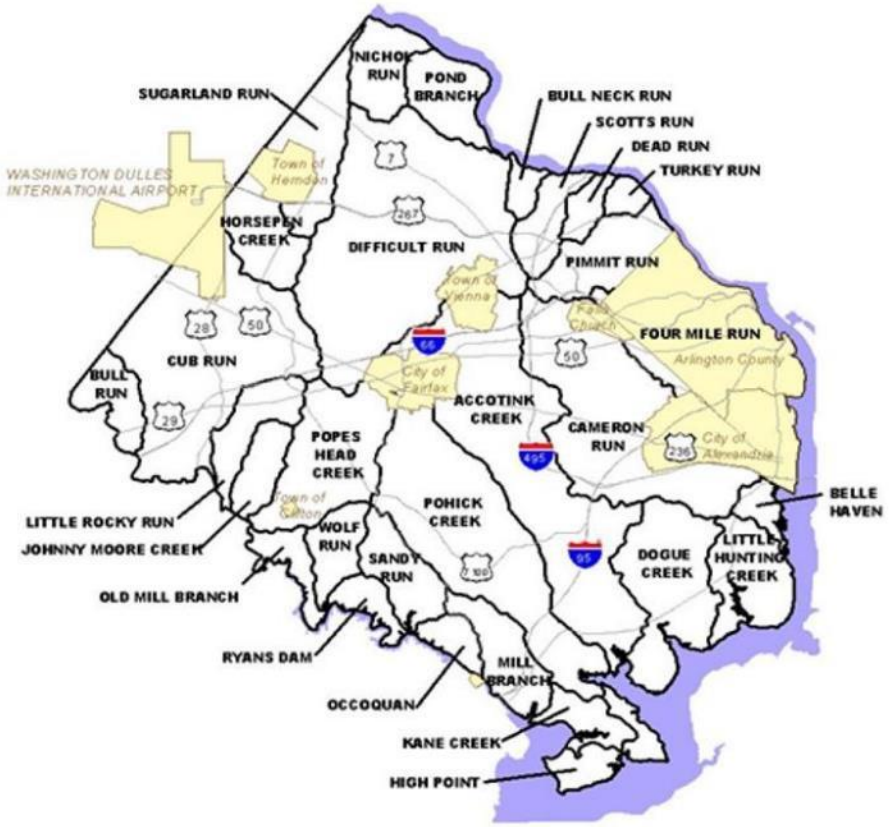
- Permit re-issued to Fairfax County on April 1, 2015
  - Compliance coordinated by Stormwater Management
  - Requirements implemented by many County agencies and partners
- Authorizes specific discharges from the MS4 to waters of the State/U.S.
- Requires development and implementation of an MS4 Program to:
  - Reduce the contamination of stormwater runoff
  - Prohibit illicit discharges

TMDL Action Plans

- Permit also requires development of TMDL Actions Plans to address WLAs assigned to the County's MS4
  - DEQ Guidance Memos for Chesapeake Bay Local TMDL Action Plans
- TMDL Action Plans must be submitted to DEQ no later than March 31, 2017 for TMDLs approved prior to April 1, 2015
- TMDL Action Plans involve the integration of several efforts:
  - Delineation of the MS4 service area
  - Specific TMDL Action Plan content required by DEQ
  - Coordination of strategies to meet multiple TMDLs, including the Chesapeake Bay TMDL
  - Leveraging stream restoration and retrofit projects from the County's WMPs and other planning efforts

Before there were specific Bay TMDL requirements…

- Fairfax County developed WMPs for each of the County's 30 watersheds
- Plans identify and address issues affecting water quality
- Include policies and projects
- Many projects in the plans can be used to meet the Chesapeake Bay and local TMDLs
- Plans can be found at www.fairfaxcounty.gov/dpwes/watersheds/



Chesapeake Bay TMDL

Chesapeake Bay TMDL – A Long, Winding Road

- Voluntary interstate effort formalized by 1983 Chesapeake Bay Agreement
- Shift from voluntary to regulatory – lawsuit and 2010 Chesapeake Bay TMDL
  - Largest TMDL ever developed by the U.S. Environmental Protection Agency (EPA)
  - Identifies pollutant reductions needed to meet applicable WQS in the Bay and its tidal rivers and embayments
  - Pollutants of concern (POCs) in the TMDL are TN, TP, and TSS
  - Means and methods in place by 2025

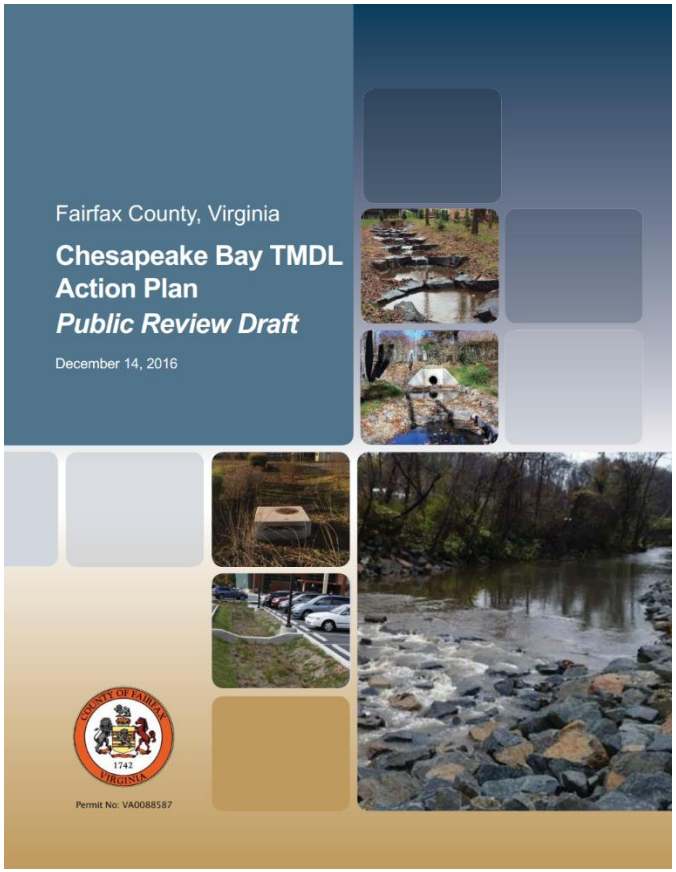
Virginia's Plan for the Chesapeake Bay

- Virginia Watershed Implementation Plan (WIP) Phase I and II
- Virginia's challenge – it can only require reductions for entities subject to permits or regulations
  - Retrofits of existing urban lands to reduce pollutant loads
    - Impervious urban lands: 9% TN, 16% TP, 20% TSS
    - Pervious urban lands : 6% TN, 7.25% TP, 8.75% TSS
  - MS4s must achieve required reductions over next three permit cycles

Schedule	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
5% by 2020	2,959.42	323.42	263,865.57
40% by 2025	23,675.36	2,587.36	2,110,924.56
100% by 2030	59,188.4	6,468.4	5,277,311.4

Key Components of the Bay Action Plan

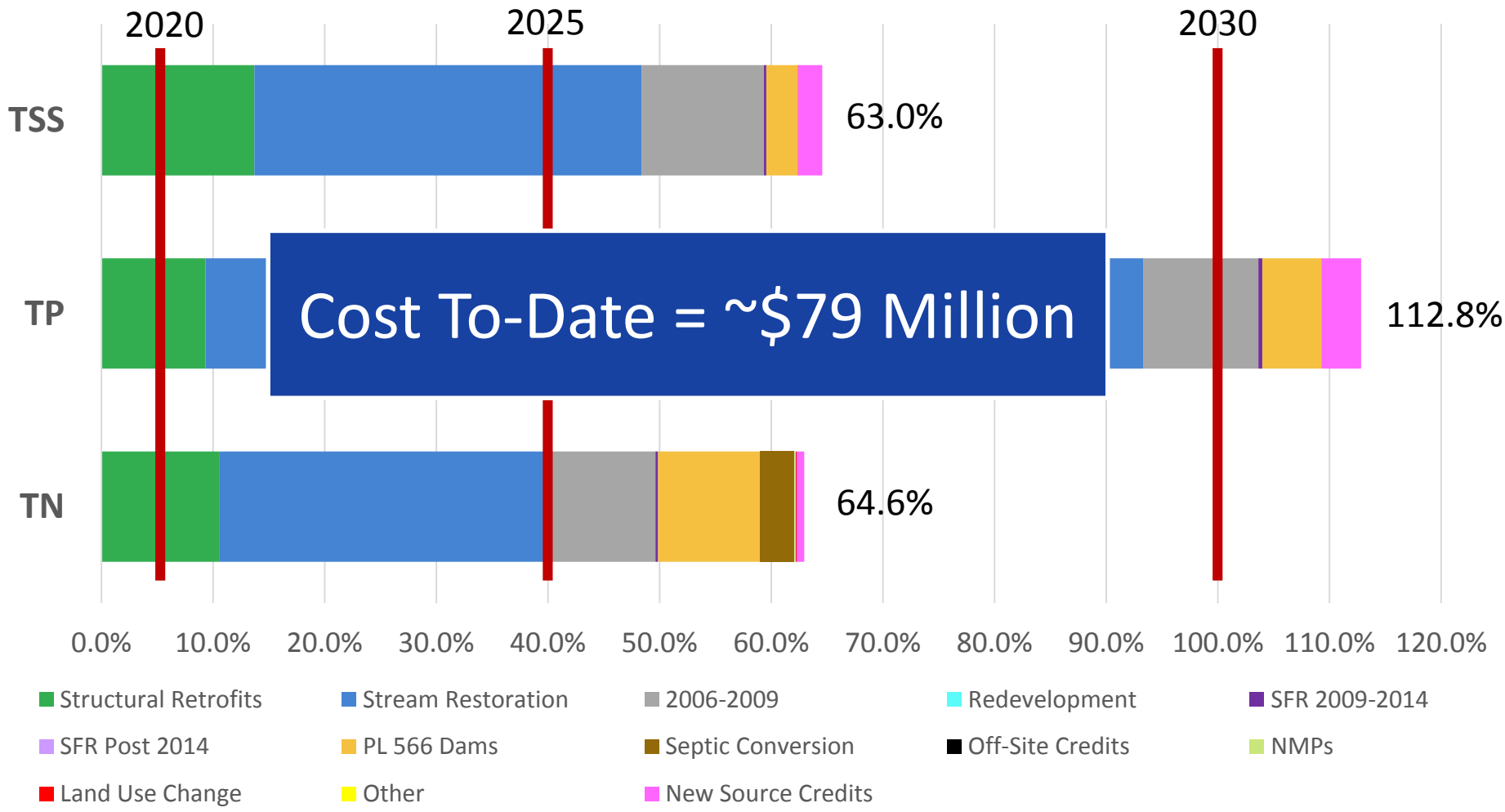
- Detailed guidance provided by DEQ
  - Guidance Memo 15-2005: Chesapeake Bay TMDL Special Condition Guidance
- New development:
  - No net increase in TP load: Fairfax County Stormwater Management Ordinance (July 1, 2014)
  - Address increases from 2009 to 2014
  - Make up for increases from grandfathered projects
- Means and methods to reduce POCs from existing development



Bay Action Plan Means and Methods

- The County has been preparing for a while!
  - Stormwater retrofits since 2009
  - Stream restorations since 2010
- Credit for past actions not captured in the Bay Model
  - Stormwater facilities installed from 2006 to 2009
- Credit for going above regulatory minimums
  - Nutrient management plans
  - Single family residential development under one acre
- Project selection process:
  - Watershed management plans and other inputs
  - Technical feasibility
  - Community support
  - Ability to address local impairments
  - Cost-benefit ratio
- MOUs with Herndon and Vienna

Current Bay Action Plan Compliance Snapshot



Current Bay Action Plan Compliance Snapshot

	TN lbs/year	TP lbs/year	TSS lbs/year
Required Reductions from Existing Sources (5% by 2020)	2,959	323	263,866
+ Offset Increases from 2009 to 2014	-408	-230	-114,820
+ Offset Grandfathered Projects	56	8.1	3,727
= Total Required Reductions and Offsets for Current Permit Cycle (by 2020)	2,608	102	152,772
- Credit for Historic BMPs (2006-2009)	5,705	670	577,628
- Stormwater Retrofit Projects	6,230	602	722,130
- Stream Restoration Projects	17,447	5,438	1,832,406
- Land Use Change	37	0.5	207
- In-Lake Forebay Projects (PL 566 Dams)	5,424	341	149,689
- Redevelopment	Data Coming Soon	Data Coming Soon	Data Coming Soon
- Single Family Residential < One Acre	135	22	11,978
- Septic Conversion to Sanitary Sewer	1,807	--	--
- Nutrient Management Plans	90	1.8	--
= Total Reductions Achieved Using Means and Methods from Section 5	36,875	7,077	3,294,038
Reductions Remaining for Current Permit Cycle	-34,267	-6,975	-3,141,266
Credit Applied to Next Permit Cycle	34,267	6,975	3,141,266

Stream Restoration

Pollutant	TN (lbs/year)	TP (lbs/year)	TSS (lbs/year)
Net Reduction (Credit)	17,447	5,438	1,832,406
Percent of Total (2030) Target	29.4%	84.0%	34.7%

Uncertainties, Challenges, and Next Steps

- Remaining POC Reductions
  - Still must achieve additional ~40% of required reductions in TN and TSS
  - Several projects not yet constructed (in-design or being scoped)
  - Fewer easily accessible stream restoration projects
- 2017 Mid-Term Assessment and WIP Phase III
  - Changes in POC reduction targets?
  - Changes in target dates?
- Local TMDL Action Plans for Sediment
  - Higher local reduction targets
  - Bull Run, Difficult Run, and Popes Head Creek
- Maintenance is Critical
  - Credits will expire if projects are not maintained

Benthic (Sediment) TMDL

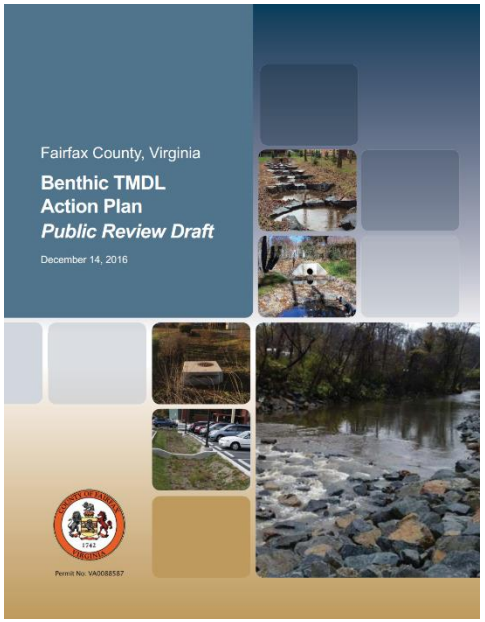
Relationship of Sediment TMDL to Bay TMDL

- DEQ encourages coordination of strategies to meet multiple TMDLs
  - The Sediment TMDL Action Plan leverages reductions achieved for TSS under the Chesapeake Bay TMDL Action Plan
- However, there are several key differences:

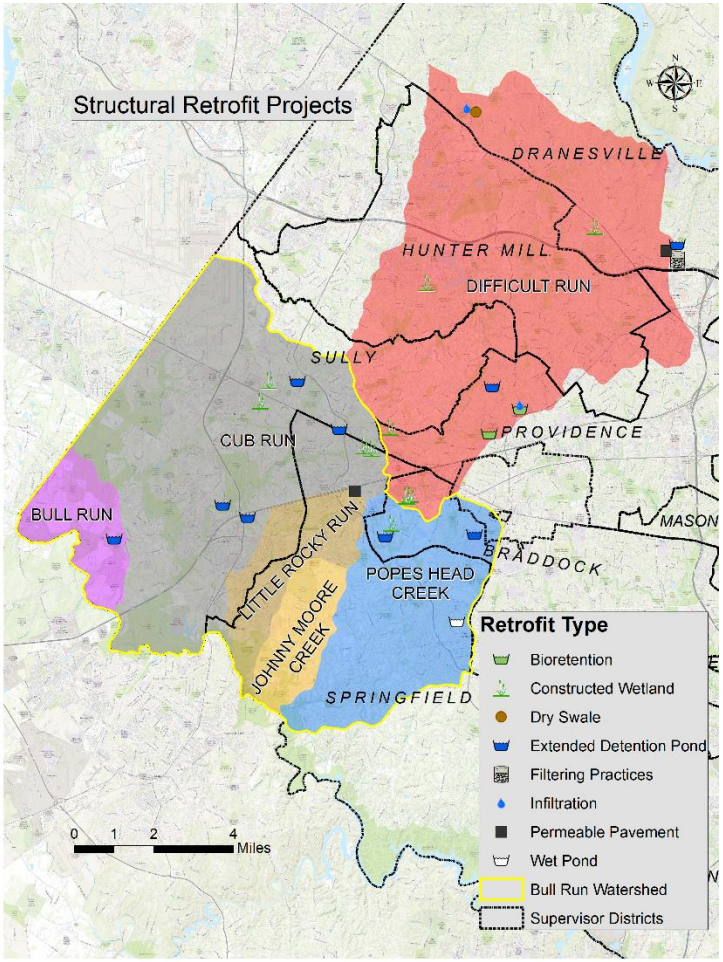
Key Differences	Chesapeake Bay TMDL	Local TMDLs
Assignment of Pollutant Reductions	Specific to Fairfax County	Aggregated with other MS4s (Fairfax County Public Schools, Virginia Department of Transportation, etc.)
Deadline for Compliance	Implementation must be completed over three permit cycles (by 2030)	Iterative implementation over multiple permit cycles
Sediment Loading Factors	Assumes transport loss in sediment reduction from stream restoration to the Bay	Full credit for sediment reduced by stream restoration
Reduction Efficiencies	Techniques well-defined for TN, TP and TSS	For bacteria and PCBs, techniques are mostly non-structural, reduction efficiencies not well defined

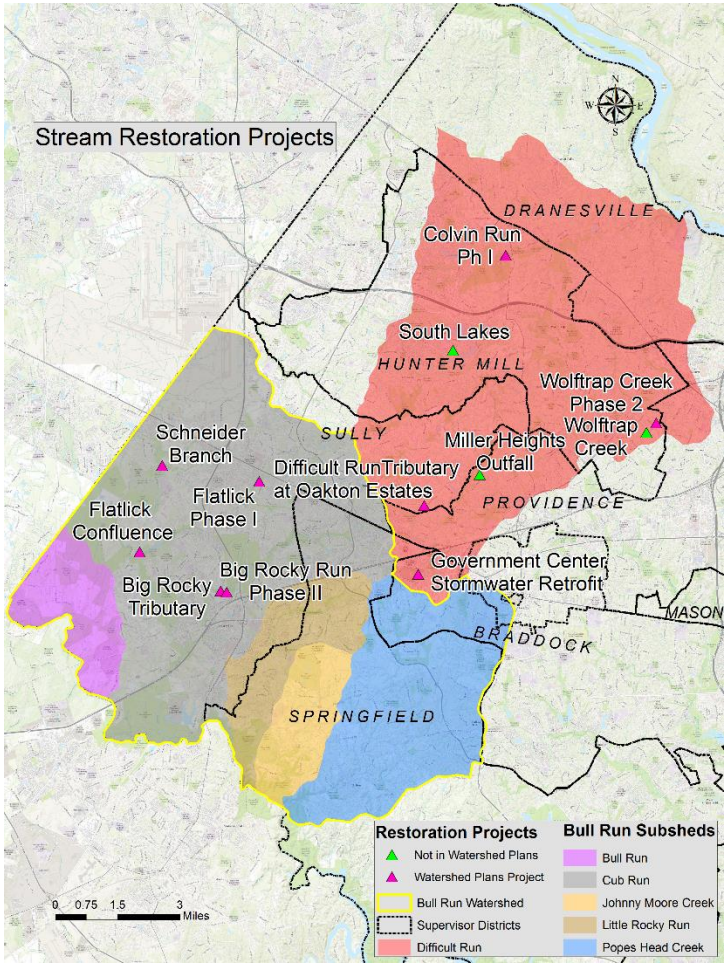
Key Existing and Planned Program Elements

- Control sediment from new development
  - Erosion and Sedimentation Control Ordinance during construction (Chapter 104 of County Code)
  - Stormwater Management Ordinance for post-construction design (Chapter 124 of County Code)
- Achieve load reductions through redevelopment
- Identify and eliminate illicit discharges
  - Dry weather outfall screening
  - Staff training
  - Public education and reporting mechanisms
- Assess opportunities to reduce sediment loads
  - County WMPs
  - 2013 County Facility Site Assessment Project
- Leverage Chesapeake Bay TMDL Action Plan



Structural Retrofit and Stream Restoration Projects





Reductions Achieved To Date and Next Steps

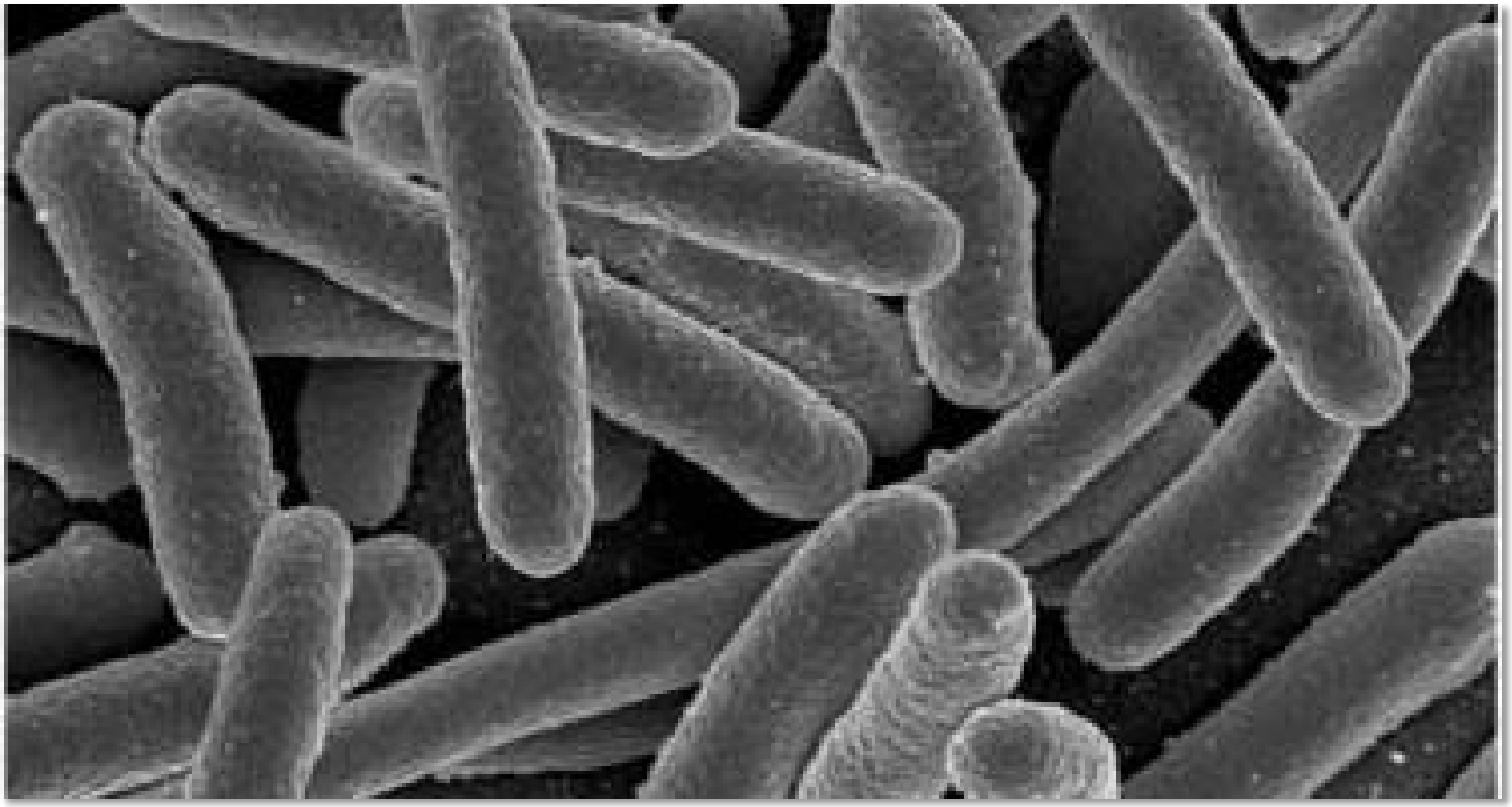
Waterbody	Existing Aggregated Sediment Load (lbs/yr)	Load Reduction Required (lbs/yr)	Load Reductions Achieved by Fairfax County To-Date (lbs/yr)
Bull Run[1]	38,941,000	30,039,800	1,407,131
Difficult Run[2]	10,633,200	3,443,200	1,439,143
Popes Head Creek[1]	4,350,000	1,207,000	41,013

[1] WLA aggregated with VDOT, FCPS

[2] WLA aggregated with City of Fairfax, Town of Vienna, VDOT, FCPS and George Washington Parkway

- Continue to coordinate with Chesapeake Bay TMDL Action Plan
  - Prioritize projects in watersheds with local sediment TMDLs
  - Implement at least one additional project in each watershed by March 31, 2020
- Reassess approach after Chesapeake Bay TMDL reductions are achieved

Bacteria



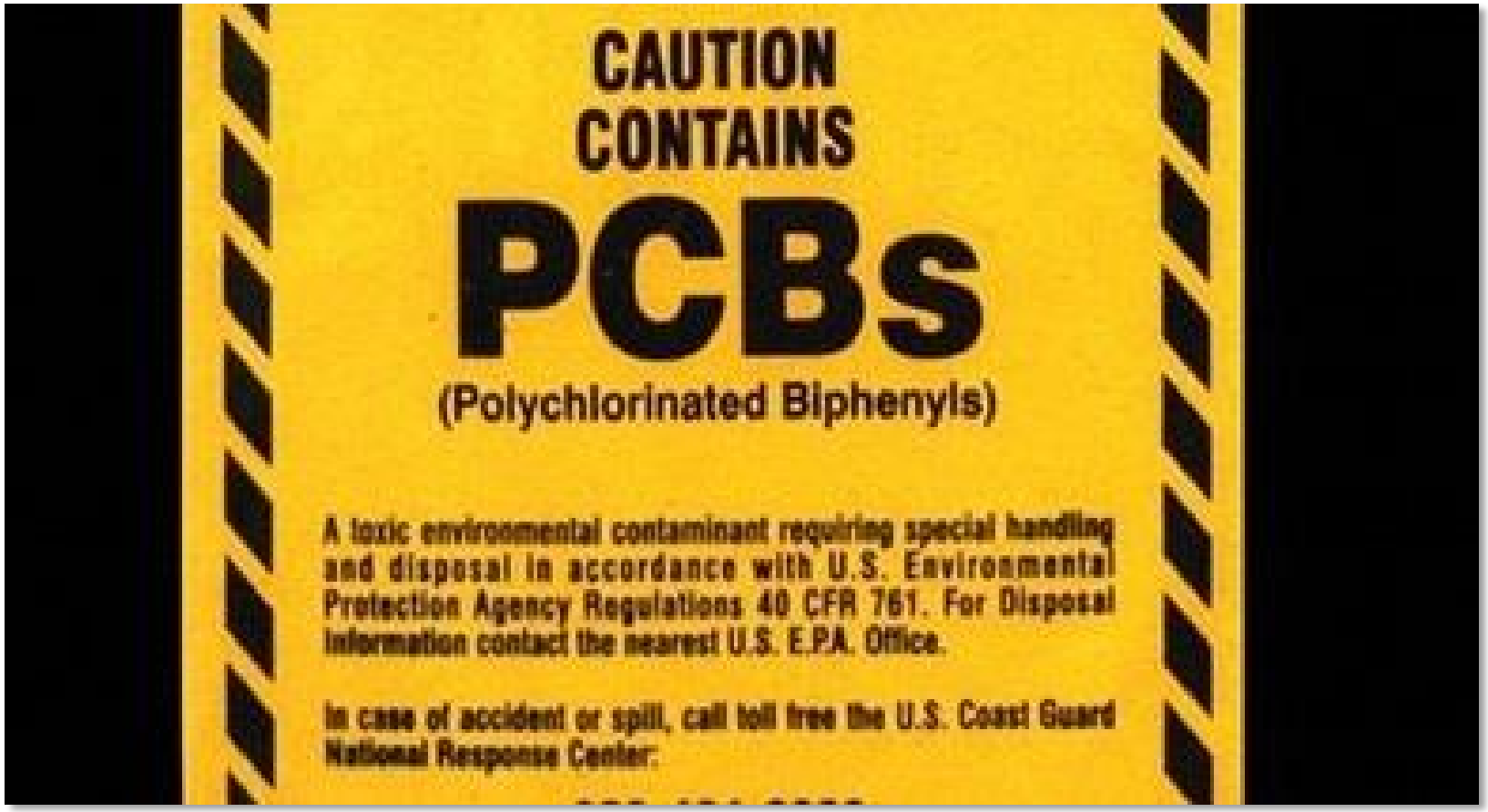
Reduction Targets and Sources

- TMDL reduction targets range from 83% to 99%
- Potential sources:
  - Sanitary sewer cross-connections
  - Sanitary sewer overflows
  - Failing septic systems
  - Pet waste
  - Wildlife

Key Existing and Planned Program Elements

- Prohibit illicit discharges to the storm sewer system
  - Stormwater Management Ordinance (Section 124-9-3 of County Code)
  - "Pooper Scooper" law (Section 41.1-2-6 of County Code)
- Identify and eliminate illicit discharges
  - Sanitary sewer inspection program
  - Dry weather outfall screening
  - Staff training
  - Public education and reporting mechanisms
- Septic system pump out program
- Public education and outreach
  - Storm drain marking
  - Northern Virginia Regional Commission Clean Water Partners
- Geese and deer management programs

Polychlorinated Biphenyls (PCBs)



Reduction Targets and Sources

- Legacy pollutant banned for most uses in 1979
- Target reduction for areas draining from Fairfax County = 74.7%
- Potential sources:
  - High risk industrial facilities
  - Improperly discarded fluorescent light ballast manufactured prior to 1979
  - Improperly discarded or accidentally damaged transformers
    - Some existing Dominion transformers may still contain amounts above reportable thresholds
  - Other electrical equipment containing substances under the trade names Aroclor, Pyranol, Inerteen, and Noflamol
- No County-owned facilities are listed in EPA's PCB Transformer Registration Database

Key Existing and Planned Program Elements

- Same prohibition on illicit discharges and improper disposal as with Sediment and Bacteria TMDL Action Plans
- Industrial and high risk runoff program
  - Inspect point of connection to MS4 for evidence of significant pollutant loads
  - Require control measures as necessary and/or appropriate
- Enhanced training for County employees
  - Potential sources that may be encountered at County facilities and/or in the field
  - What to do if equipment, machinery, or contaminated soil is discovered that may contain PCBs

Public Comment Process and Next Steps

- Public Meetings:
  - December 14 and 15, 2016 at the Fairfax County Government Center
  - January 3, 2017 at the Mount Vernon Governmental Center
- Public Comment Period: December 14, 2016 to January 23, 2017
- Comments Received from Environmental Quality Advisory Council, Friends of Accotink Creek, Friends of Dyke Marsh and Chesapeake Bay Foundation
  - Requests for clarification
  - Policy recommendations
  - Increased public outreach and involvement
  - Proposed additional/alternative environmental measures/goals
- Comments are being evaluated and will be addressed as appropriate
- TMDL Action Plans must be submitted to the DEQ by March 31, 2017

Additional Information

For additional information, please contact

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www.fairfaxcounty.gov/dpwes

Stormwater Management – Business Plan 2017

Program Status, Challenges, Drivers and Costs – Planning for The Future

Department of Public Works and Environmental Services

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Business Plan 2017 Overview

- Study Purpose – A chance to step back and assess status
  - Identify challenges and drivers for the future
    - Science and policy in stormwater management is continuing to evolve, creating its own set of challenges.
    - Manage change effectively and efficiently is goal.
  - Complete review of opportunities for improvement.
  - Reevaluate financial plan to ensure sufficiency in resources.
  - Engage staff across multiple agencies to strengthen partnerships.
  - Identify actions that support efficiencies in program execution.
- Study Process – Due Diligence and Transparency
  - 3 Staff Teams with representation across DPWES.
  - Focus on **Operations**, **Contracting**, and **Crosscutting Issues.**
  - **10-Year** planning horizon with updated financial model.
  - Evaluation of funding strategy.

Reviewing Past Projects and Scoping Future Projects

Status of Stormwater Programs and Services

- **Rapid growth** over past decade is driven by regulatory and infrastructure needs.
- **Program elements are maturing**
- **Solid foundation in place** to build on policy and best practices.
- **Have a greater understanding of drivers** in regulatory mandates and infrastructure conditions.
- Create opportunity to **adjust, improve, prepare -** looking forward.

Little Pimmit Run Stream Restoration

Study Targets

- **Operational Focus**
  - Asset management
  - Project implementation
  - Chesapeake Bay strategy
  - Local stream and drainage system improvements
  - Long term
- **Process Focus**
  - Contracting procedures
  - Data management
  - Project implementation
- **Crosscutting Issues**
  - Public Education and Outreach
  - Safety

Program Opportunities – A Balanced Program

- Compliance
  - Based on current targets – achieve Bay goals by 2025
  - Strong foundation to address other MS4 permit requirements
- Asset management
  - Increase investment to address drainage system needs
  - Evaluate and plan for neighborhood focused program
- Natural system protection
  - Increase focus on stream protection and impairments
- Regional partnerships
  - Continue support for efficiency and effectiveness
- Emergency response and flood risk
  - Focus on planning and mitigation

Chesapeake Bay TMDL – Status 2017

Metric	Amount	Method	FY16 Estimate	Target	Priority	Notes
Chesapeake Bay TMDL – nitrogen Reductions	59,188.4 Pounds (Based on 2017 Ches. Bay TMDL Action Plan – subject to change)	**Percent Complete**	**63% (Based on 2017 Ches. Bay TMDL Action Plan – subject to change)**	100%	Must	Regulatory target 5% by 2020, 40% by 2025 and 100% by 2030. MS4 permit requirement – amount and timing subject to change in next MS4 permit (2020).
Chesapeake Bay TMDL – phosphorus reductions	6,468.4 Pounds (Based on 2017 Ches. Bay TMDL Action Plan – subject to change)	**Percent Complete**	**113% (Based on 2017 Ches. Bay TMDL Action Plan – subject to change)**	100%	Must	Target 5% by 2020, 40% by 2025 and 100% by 2030. MS4 permit requirement – amount and timing subject to change in next MS4 permit (2020).
Chesapeake Bay TMDL – sediment reductions	5,277,311.4 Pounds (Based on 2017 Ches. Bay TMDL Action Plan – subject to change)	**Percent Complete**	**65% (Based on 2017 Ches. Bay TMDL Action Plan – subject to change)**	100%	Must	Target 5% by 2020, 40% by 2025 and 100% by 2030. MS4 permit requirement – amount and timing subject to change in next MS4 permit (2020).

What does this mean? County can meet current targets in 2025

Evaluation of Costs

FIVE YEAR SUMMARY - FUTURE COST OF SERVICE					
Cost Center	FY18	FY19	FY20	FY21	FY22
General Operations	$ 23,566,000	$ 25,037,000	$ 26,064,000	$ 27,072,000	$ 27,872,000
Special Projects	$ 2,354,000	$ 2,429,000	$ 2,506,000	$ 2,586,000	$ 2,668,000
Emergency and Flood Response	$ 8,596,000	$ 4,743,000	$ 1,780,000	$ 1,819,000	$ 1,860,000
Dam Safety and Facility Rehabilitation	$ 15,880,000	$ 4,579,000	$ 5,069,000	$ 6,524,000	$ 7,170,000
Regulatory Programs	$ 8,069,000	$ 5,423,000	$ 5,542,000	$ 5,957,000	$ 6,169,000
Stormwater Conveyance	$ 8,040,000	$ 9,315,000	$ 11,410,000	$ 13,934,000	$ 14,288,000
Stream and Water Quality	$ 19,781,000	$ 28,245,000	$ 31,747,000	$ 32,320,000	$ 33,936,000
Support to DPWES Operations	$ 1,360,000	$ 1,751,000	$ 1,803,000	$ 1,857,000	$ 1,913,000
New Facility Debt Service	$ -	$ 300,000	$ 3,500,000	$ 3,500,000	$ 3,500,000
TOTAL COSTS	$ 87,646,000	$ 81,822,000	$ 89,421,000	$ 95,569,000	$ 99,376,000

** **Dam Safety and Facility Rehabilitation FY 18 Costs** – includes $9.5M for Kingstowne Park – need to adjust project plan to balance against revenues.

Financial Sufficiency

- Special Service District Tax = $0.0275 rate
- Based on current conditions rate should grow to $0.04 over next four years and adjusted to address full program based on changes in mandates.
- **Future Challenges** that may impact program:
  - Chesapeake Bay TMDL reduction targets may change with model update
  - Cost of operation of green infrastructure – long-term maintenance costs
  - MS4 Permit renewal in 2020
  - State approach to credit structure for TMDLs
  - Asset management of conveyance dependent on completion of inspection program

FY 15 Project Completion

Project Name	Stream Restoration: Length Restored(LF)	Pond Retrofits: Area Treated (Ac)	Construction Completion	Design	Land Acquisition	Permit	Construction	WPFO	UTILITIES	Total Cost
Oak Marr Rec Center Stormwater Enhancements (DF87-0006)		0.95	8/1/2014	$23,274			$155,785			$179,059
Miller Heights Outfall	233	26.72	8/7/2014	$38,000		$400	$162,300		$9,700	$210,400
Bailey's Crossroads Fire Station			8/10/2014	$51,827			$55,000	$4,661		$111,488
Crosspointe Sec 15 Pd 15A (0775DP)		11.99	8/23/2014	$101,237		$100	$73,883	$21,424		$196,644
Mount Vernon High School Practice Field		1.64	9/3/2014	$10,250			$60,315	$3,553		$74,118
Oakton Library		1.78	9/15/2014	$39,776		$6,516	$262,829	$23,000	$2,500	$334,621
Indian Run Stream Restoration	590		9/26/2014	$393,800			$559,800			$953,600
Fire and Rescue Training Academy II		0.82	9/27/2014	$43,402			$75,808			$119,210
South Lakes Stream Restoration	660	20.96	10/1/2014	$206,918		$120	$480,681		$20,362	$708,081
Woodgate Basins (0950DP, 1024DP)		0.87	10/3/2014			$200	$35,724			$35,924
Banks Property Stream Restoration	1142		11/7/2014	$394,300	$1,200	$110	$770,000	$73,397	$11,000	$1,250,007
Brookfield Park Dam		48.86	11/14/2014	$328,843		$15,347	$2,495,000		$1,911	$2,841,101
Armfield Sec 5		78.79	11/15/2014	$32,345	$4,880	$600	$267,104		$12,484	$317,413
Village Park, The Sec 2B, 3 (PC81-0001/0090DP)		11.21	11/17/2014	$31,250	$4,900	$460	$335,000		$7,361	$378,971
Merrifield Human Services Center (Mid County)		1.02	11/21/2014	$4,350			$237,753	$36,070		$278,173
Woodrow Wilson Library Stormwater Enhancements		0.7	1/13/2015	$40,735			$193,144	$16,108		$249,987
Stratton Woods Park Stormwater Enhancements (HC87-0001)		0.42	2/6/2015	$17,014			$21,000			$38,014
Bradley Acres Section 2A Retrofit		37.43	3/16/2015	$90,500		$600	$444,510	$0	$0	$535,610
Rolling Valley West Synthetic Field (PC87-0002)		1.45	4/1/2015	$41,658			$23,444			$65,102
Oakton Swim and Racquet Club (DF9045A6)		43.74	4/20/2015	$46,500		$660	$218,600		$4,600	$270,360
Americana Park			4/30/2015	$5,317			$11,664			$16,982
Mason Neck West		12.01	5/1/2015	$82,654		$660	$180,601	$7,784		$271,700
Difficult Run Tributary at Oakton Estates (DF9045)	300		6/26/2015	$85,000		$200	$211,000		$14,000	$310,200

ID	Project Name	Fiscal year	Design and Construction Cost ($)	Restored Length (LF)	TN Removed (lb)	TP Removed (lb)	TSS Removed (lb)	CostPerTN	CostPerTP	CostPerTSS	Watershed	
27	Poplar Springs	FY2009	$298,200.00	693	313.99	58.28	20,094.37	$949.70	$5,116.26	$14.84	Pohick Creek	$430.30
28	Seven Woods	FY2009	$4,300.00	185	54.37	5.19	1,788.10				Little Hunting Creek	
30	Big Rocky Tributary	FY2010	$191,600.00	336	137.74	21.19	7,307.04	$1,391.05	$9,040.10	$26.22	Cub Run	$570.24
31	Dolley Madison Library - Dead Run Stream Restoration	FY2010	$594,400.00	1400	519.67	98.12	33,828.90	$1,143.81	$6,057.73	$17.57	Dead Run	$424.57
32	Bridle Path Stream Restoration	FY2011	$898,130.00	1650	790.72	138.77	47,843.73	$1,135.84	$6,471.93	$18.77	Scotts Run	$544.32
34	Schneider Branch Stream Restoration	FY2011	$631,100.00	1000	275.92	26.21	9,037.15	$2,287.27	$24,076.09	$69.83	Cub Run	$631.10
35	Government Center Stormwater Retrofit	FY2012	$275,000.00	1000	326.14	65.88	22,713.69	$843.19	$4,174.11	$12.11	Difficult Run	$275.00
36	Patriot Village Sec 2	FY2012	$44,140.00	220	78.97	3.08	1,063.19				Accotink Creek	
38	Villa D'Este Village Sec 3	FY2012	$92,550.00	260	19.50	17.68	11,668.80				Accotink Creek	
39	Tripps Run	FY2013	$676,656.00	1430	784.78	120.27	41,464.56	$862.23	$5,626.13	$16.32	Cameron Run	$473.19
40	Beach Mill Road Stream Restoration	FY2014	$318,091.00	250	74.84	10.51	3,624.52	$4,250.22	$30,256.56	$87.76	Pond Branch	$1,272.36
41	Sandy Run Stream Restoration	FY2014	$211,658.00	300	133.24	8.41	2,899.62	$1,588.57	$25,165.92	$73.00	Sandy Run	$705.53
43	Wolftrap Creek	FY2014	$1,749,434.00	2089	1,016.02	90.78	31,296.08	$1,721.85	$19,272.00	$55.90	Difficult Run	$837.45
44	Wakefield Run Stream Restoration	FY2014	$549,000.00	816	354.99	40.03	13,802.19	$1,546.54	$13,713.35	$39.78	Accotink Creek	$672.79
45	Difficult Run Tributary at Oakton Estates (DF9045)	FY2015	$337,000.00	300	120.98	18.92	6,524.14	$2,785.53	$17,808.43	$51.65	Difficult Run	$1,123.33
46	Indian Run Stream Restoration	FY2015	$795,020.94	590	217.58	49.62	17,107.76	$3,653.94	$16,021.56	$46.47	Cameron Run	$1,347.49
47	Paul Spring Branch Tributary at GMP	FY2016	$330,642.89	562	185.19	41.36	5,120.59	$1,785.40	$7,994.53	$64.57	Little Hunting Creek	$588.33
48	Banks Property Stream Restoration	FY2015	$1,170,000.00	1142	394.65	32.02	11,037.89	$2,964.67	$36,544.26	$106.00	Dogue Creek	$1,024.52
49	Flatlick Confluence Stream Restoration	FY2011	$633,530.00	1400	105.00	95.20	62,832.00	$6,033.62	$6,654.73	$10.08	Cub Run	$452.52
50	South Lakes Stream Restoration	FY2015	$646,508.73	660	141.19	12.77	4,401.62	$4,579.10	$50,638.50	$146.88	Difficult Run	$979.56
56	Rabbit Branch Tributary(PC9263)	FY2014	$643,721.45	1067	352.49	22.44	7,734.74	$1,826.21	$28,692.72	$83.22	Pohick Creek	$603.30
57	Big Rocky Run Phase II	FY2014	$2,457,798.40	2550	1,075.28	212.30	73,191.24	$2,285.73	$11,577.28	$33.58	Cub Run	$963.84
62	Pohick Creek Tributary Stream Restoration (PC9257)	FY2014	$784,246.58	900	249.68	15.14	5,219.32	$3,140.97	$51,803.41	$150.26	Pohick Creek	$871.39
63	Pohick Creek Tributary Stream Restoration (PC9257)	FY2014	$55,768.65	64	17.56	0.99	340.22	$3,175.81	$56,512.81	$163.92	Pohick Creek	$871.39
64	Pohick Creek Tributary Stream Restoration (PC9257)	FY2014	$304,984.78	350	123.29	7.36	2,537.17	$2,473.72	$41,442.73	$120.21	Pohick Creek	$871.39
65	Rabbit Branch Tributary(PC9263)	FY2014	72396.0396	120	27.23	2.86	985.87	$2,658.36	$25,317.11	$73.43	Pohick Creek	$603.30
66	Rabbit Branch Tributary(PC9263)	FY2014	197882.5083	328	73.63	4.14	1,426.61	$2,687.38	$47,821.20	$138.71	Pohick Creek	$603.30
67	Scotts Run at Arbor Row Hanover Parcel	FY2014	$238,000.00	790	246.98	64.34	22,182.09	$963.65	$3,699.08	$10.73	Scotts Run	$301.27

Cost Benefit – Stream Projects 2009-2016

	Stream Restoration				
	Total Cost ($)	TN Removed (lb/yr)	TP Removed (lb/yr)	TSS Removed (lb/yr)	Restored Length (LF)
FY2009	$ 302,500	368.36	63.47	21,882.46	878
FY2010	$ 786,000	657.40	119.32	41,135.94	1,736
FY2011	$ 2,162,760	1,171.64	260.19	119,712.88	4,050
FY2012	$ 411,690	424.61	86.65	35,445.68	1,480
FY2013	$ 676,656	784.78	120.27	41,464.56	1,430
FY2014	$ 7,582,981	3,745.23	479.29	165,239.67	9,624
FY2015	$ 2,948,530	874.40	113.33	39,071.41	2,692
FY2016	$ 330,643	185.19	41.36	5,120.59	562
Grand Total	$ 15,201,760	8,211.62	1,283.86	469,073.21	22,452

Wakefield Park Stream Restoration

	Stream Restoration				
	Average of $/lb TN	Average of $/lb TP	Average of $/lb TSS	Average of $/LF	Number of Projects
FY2009	$ 950	$ 5,116	$ 15	$ 227	2
FY2010	$ 1,267	$ 7,549	$ 22	$ 497	2
FY2011	$ 3,152	$ 12,401	$ 33	$ 543	3
FY2012	$ 843	$ 4,174	$ 12	$ 277	3
FY2013	$ 862	$ 5,626	$ 16	$ 473	1
FY2014	$ 2,360	$ 29,606	$ 86	$ 822	8
FY2015	$ 3,496	$ 30,253	$ 88	$ 1,119	4
FY2016	$ 1,785	$ 7,995	$ 65	$ 588	1
Grand Total	$ 2,349	$ 22,060	$ 65	$ 680	29

Completed Facilities FY09-16

Practices	Number Installed	Capital Cost ($/(lb/yr))		
		TN	TP	TSS
Stream Restoration	22	$ 2,200	$ 21,500	$ 64
Pond Retrofits	56	$ 6,300	$ 94,369	$ 49
Infiltration Swales & Trenches	7	$ 10,000	$ 93,000	$ 124
Dry Swales	13	$ 9,593	105,748	$ 154
Bioretention (Rain Gardens)	39	$ 22,800	$ 188,000	$ 248
Pervious Pavement	21	$ 34,264	$ 296,270	$ 386

**Focused on the Bay TMDL, Local TMDL's will require some different metrics

Project Cost Trends

- Rapid expansion in amount of projects
  - Availability of materials
  - Availability of skilled workers
  - Number of projects locally and regionally increasing
- Contractors, Engineers, and Owners are still learning
  - Work is much more specialized than originally envisioned
  - Providing warranties on natural systems is risky
  - Community expectations – saving trees, keeping paths open

Rainbow Bridge Outfall Restoration

Conclusions

- Program is on a sound basis to manage change.
- Balanced program builds for the future.
- Metrics developed in Plan project performance goals and set expectations.
- Program maturity brings greater stability and predictability.
- Flexibility is critical due to uncertainties; ability to update analysis is a key outcome of Plan.

Brookfield Pond

Additional Information

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Stormwater Management – Utility Funding Option

Department of Public Works and Environmental Services

Working for You!

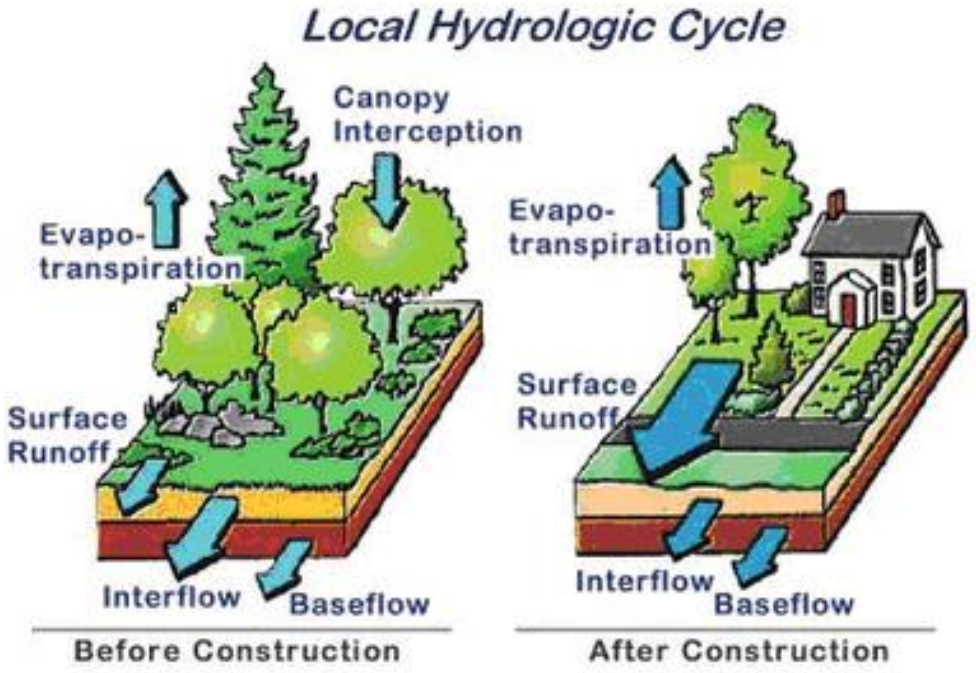
A Fairfax County, VA, publication

February 7, 2017

Stormwater Utility Financing in Virginia

Utility features:

- **Creates relationship between the need for public stormwater and the amount paid per property**
- **Impervious area is basis of charge in VA**
- **Credits provided**
- **Operates similar to wastewater financing**



Stormwater Utility Financing in Virginia

- **Who can be charged?** **All properties** EXCEPT those excluded by law.
- **How is cost allocated?** Based on **impervious area** on each parcel.
- **How is the fee collected?** Have choices - can use tax bill, separate bill, utility bill.
- **What if the bill isn't paid?** Can collect using same tools as tax bill.
- **Are credits available to offset fees?** Credits are mandated by law for some and allowable for others.

Analysis based on Business Plan

Two Rate Scenarios Analyzed Based on Impervious Area

- **Equivalent Residential Unit (ERU) Approach**
  - Median impervious area for single family detached residential – set ERU
  - Measure impervious area on all other properties and determine number of ERUs
  - ERU Rate: $149.97/year for each billing unit of 3065sf (SFDR pay one billing unit)
- **Fixed Billable Unit Rate Per Square Foot of Imperviousness**
  - Treats all properties with IA the same regardless of land use
  - $22.30/year for each billing unit of 500sf
  - Provides credits

Impacts on Property Classes – ERU Rate

Land Use	# of Billing Units (ERU)	Revenue ERU	Sum of TAX LEVIED	Comparison Tax to ERU Revenue
SFDR	*193,553**	$29,027,143	$34,503,123	($5,475,980)
Townhouse	30,007	$4,496,670	$9,238,013	($4,741,342)
Apartments	18,365	$2,754,019	$3,391,327	($637,308)
Condominium	15,003	$2,282,138	$3,612,245	($1,330,107)
Mobile Homes	1,374	$206,134	$31,586	$174,547
Commercial	104,603	$15,688,107	$10,863,803	$4,824,303
Industrial	3,385	$507,633	$101,184	$406,450
Institutional	5,344	$800,885	$119,645	$681,240
Mixed Use	4,279	$644,781	$559,186	$85,595
Non-profit	9,396	$1,409,103	$502	$1,408,601
Government - Municipal	1,350	$202,415	$0	$202,415
Government - County	29,599	$4,438,842	$231	$4,438,611
Government - State	834	$124,985	$0	$124,985
Government - Federal	22,558	$3,383,083	$79	$3,383,004
Government - Foreign	246	$37,058	$0	$37,058
Public Utility	1,117	$167,531	$0	$167,531
Recreational / Private Org / Open Space	32,045	$4,805,009	$30,549	$4,774,460
Agricultural	4	$600	$432	$167
Cemeteries	542	$81,299	$3,725	$77,574
Miscellaneous	5,329	$799,235	$82,511	$716,724
Undeveloped	11,784	$1,766,557	$694,240	$1,072,317

Shift in “who” pays under a fixed ERU approach .

All classes of **residential** property see an overall reduction.

Impacts on Property Classes – Fixed Billing Unit Rate

Land Use	# of Billing Units (500sf)	Revenue 500sf	Sum of TAX LEVIED	Comparison Tax to 500sf Revenue
SFDR	1,478,099	$32,961,737	$34,503,123	($1,541,386)
Townhouse	184,000	$4,102,883	$9,238,013	($5,135,129)
Apartments	112,610	$2,510,871	$3,391,327	($880,456)
Condominium	92,000	$2,051,787	$3,612,245	($1,560,458)
Mobile Homes	8,428	$187,944	$31,586	$156,358
Commercial	641,418	$14,303,778	$10,863,803	$3,439,974
Industrial	20,755	$462,845	$101,184	$361,662
Institutional	32,770	$730,809	$119,645	$611,164
Mixed Use	26,238	$585,152	$559,186	$25,966
Non-profit	57,617	$1,284,846	$502	$1,284,344
Government - Municipal	8,276	$184,559	$0	$184,559
Government - County	181,501	$4,047,459	$231	$4,047,228
Government - State	5,112	$114,009	$0	$114,009
Government - Federal	138,326	$3,084,674	$79	$3,084,595
Government - Foreign	1,509	$33,648	$0	$33,648
Public Utility	6,850	$152,755	$0	$152,755
Recreational / Private Org / Open Space	196,498	$4,381,834	$30,549	$4,351,285
Agricultural	25	$558	$432	$125
Cemeteries	3,324	$74,121	$3,725	$70,396
Miscellaneous	32,676	$728,688	$82,511	$646,177
Undeveloped	72,255	$1,611,224	$694,240	$916,984

Shift in “who” pays under a fixed billing unit of 500 sf.

All classes of **residential** property see an overall reduction.

Analysis of Impacts within SFDR Property Class

SFDR Parcel Analysis - Number of Parcels Paying Fees				
Fee Type	LESS THAN TAX (> -$5.00)	SAME AS TAX (Within $5.00)	GREATER THAN TAX (+$5.00 <)	Exclusions
ERU	104,273	16,430	69,317	*680 untaxed parcels which would encounter fee, plus another 2,833 taxable parcels with zero (0) tax amounts*
500 sf	123,121	12,832	53,901	*680 untaxed parcels which would encounter fee, plus another 2,833 taxable parcels with zero (0) tax amounts, and 166 taxable parcels without any BU's/IA*

Impacts within the Single Family Detached Residential Class

Why consider a utility approach?

- Establish a relationship between fees and usage
  - The utility approach better ties fees to usage and will more directly impact behaviors. The more you use (impervious area) the more you will pay. Greatly improves the ability to modify consumption / consumer behaviors to support program goals such as conservation or reducing effective imperviousness.
  - The utility approach will allow us to create incentives or credits (that are required by law) for the installation of stormwater controls that align with program objectives.

Why consider a utility approach?

- Psychology of paying a tax versus paying a utility / Consumer behaviors
  - Takes the program out of the general fund and out of direct competition for general fund supported programs – schools, public safety, etc…
  - The program will be better served with a rate payer/consumer relationship rather than another general funded supported program.
  - We would go through rate setting and communication processes similar to what is currently done for wastewater. Fee payers will see themselves as consumers of a service.

Why consider a utility approach?

- Other advantages
  - Bonding / financing – will better facilitate future financing opportunities
  - As the program matures and capital and operation cost increase …
  - Wastewater comparison
  - Provides a more stable source of funding – not subject to the ups and downs of commercial and residential real estate values and less susceptible to changes to the real estate rate. This helps with program management and planning for a very intensive operational and capital program.

Implementation Considerations

- Billing options
  - Water Bills – Not all properties receive water bills
  - Tax Bills – Current fee is collected on tax bill
  - Separate quarterly or monthly Stormwater bill
- Residential rates – tiered versus flat
  - Tiers based on impervious area on a lot
  - Determine number of Tiers and Ranges
- Administrative Costs
  - Regularly update GIS impervious data
  - Utility administration (estimated at <1% and decrease over time)
- Establishment and administration of credit program
  - Required by state law
  - May reduce revenues from newer properties
  - Ongoing verification program required

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Implementation Considerations Cont'

- Government owned and tax exempt properties
  - Allows us to bill non profits
  - Allows us to bill state and Federal properties that drain thru our system – Not all properties
  - Should we bill County Properties
- Towns
  - Utility fee applied to the towns (similar to the tax)
  - Update agreements
- County maintenance of private facilities
- Enterprise fund
  - Revenue based Borrowing - Do we want a bond rating
  - Need to build Reserves
  - Independent Audits
- Implementation – Phased Approach?

Issues to be Address in an Implementation Assessment

1. **Timing** – can be implemented over time
2. **Blended Funding Strategy** – use both Tax District and Utility and transition over time.
3. **Credit Program** – Evaluate incentive and recommend strategy
4. **Appeals** – determine policy and process of file maintenance and process for review
5. **Public Engagement and Input** – engage stakeholders for input and review
6. **Operational Plan** – finalize optimal operations approach to managing utility

Additional Information

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Private Residential Stormwater Management Facilities

Department of Public Works and Environmental Services

Working for You!

A Fairfax County, VA, publication
2/7/2017

Recommended Program Highlights

- Residential Ponds serving multiple properties
  - Currently 178 private residential ponds
  - County currently maintains 1,369 wet and dry public ponds
- Voluntary Program
  - Owners must provide easements
  - Owners must agree to fund initial improvements
  - Owners responsible for aesthetic maintenance
- Owner improves pond to “Functional” condition
  - County will contribute based on off site drainage area
  - County will establish special tax district to collect owners share
- County manages improvements
  - Can be a permanent dedication
  - Can be a one time permission
- County Benefits
  - Avoids enforcement actions
  - County can gain get TMDL credit for upgrades

Additional Information

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2017 Forest Pest Management Update

A Forest Health Approach

Environmental Committee Meeting

Department of Public Works and Environmental Services

Working for You!

A Fairfax County, VA, publication

February 7, 2017

Introduction

- The Forest Pest Program is required to obtain Board of Supervisors approval each year for its work plan.
- This year's plan will be presented at the February 28th meeting.
- This presentation is intended to brief you on several aspects of our plan including an Urban Forest Health and Value Assessment.

Annual Program Topics

- Gypsy Moth
- Fall Cankerworm
- Sudden Oak Death
- 1000 Cankers Disease
- Hemlock Woolly Adelgid
- Emerald Ash Borer
- Outreach

All insect populations, are cyclical in nature. Periods of high pest levels are followed by periods of low pest levels.

New Initiative

- The Urban Forest Management Forest Pest Program is proposing a project that will expand our monitoring of the forest lands in Fairfax County.
- This project will allow for a better understanding of how our forest are changing over time and allows us to accomplish our mission.
- Other agencies such as the Park Authority and Stormwater Planning will benefit from this project. Planning meetings between the three agencies show promise for this to be a valuable project.
- The one time cost of this project is $78,000.

Method

- i-Tree is a software suite from the USDA, Forest Service.
  - Quantifies trees and forests
  - Quantifies environmental services that trees provide
  - Allows measurement of change over time
  - 240 random plots will be established
  - These plots will be permanent and will be monitored over time to assess the benefits and general health of the Urban Forest.
  - Subsequent year surveys will be conducted by staff only

Benefits Measured by i-Tree

Functional Analyses:

- Pollution removal and human health impacts
- Carbon sequestration and storage
- Avoided runoff
- Building energy effects

Structural and compositional analyses:

- Species condition and distribution
- Leaf area and biomass
- Species importance values
- Diversity indices and relative performance

Forecasting modeling options including:

- Tree planting potential
- Extreme event impacts for weather and pests
- Management scenarios

Management information including:

- Pest risk analysis
- Adaptable for County issues
- Cost benefit analysis

Additional Benefits

- Data can be used by other agencies
  - Park Authority can monitor effects of stressors such as deer browse or human impacts
  - Stormwater Planning can use this data to assist in stream restoration projects.
  - Data can be used by civic groups such as HOA's when making management decisions on private property
  - Data will be used by the Urban Forestry Management Division in their strategic planning

- More information about i-Tree can be found at: http://www.itreetools.org/

Additional Information

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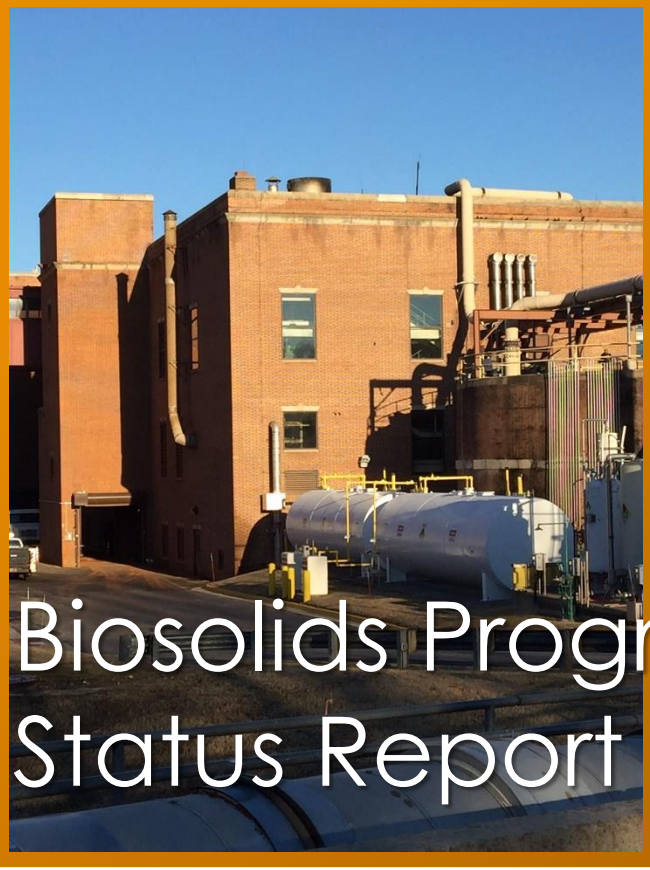


Biosolids Program & Energy Project Status Report

Department of Public Works and Environmental Services

Working for You!

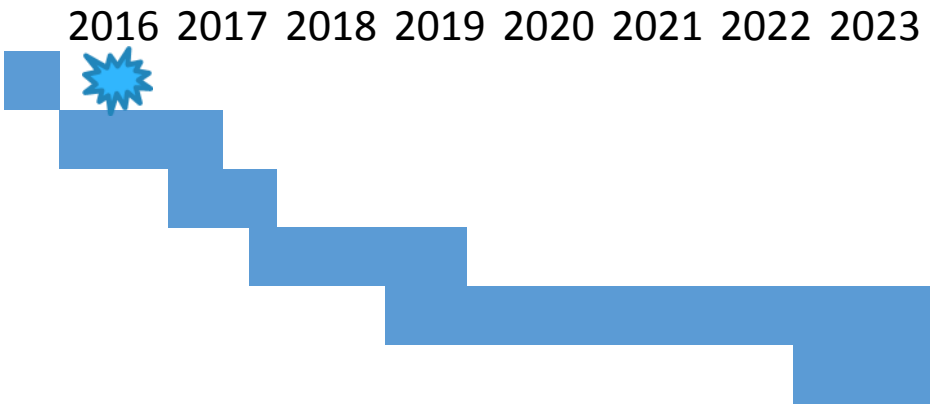
A Fairfax County, VA, publication

February 7, 2017

Biosolids Program Set of Projects

Rehabilitate the biosolids thickening, dewatering, and incineration operations in order to continue to reliably eliminate residuals from the wastewater treatment process in an environmentally compliant and sustainable manner

	millions
Pre-Purchase New Scrubbers	$1
Contractor Installation	$3
Immediate work	$2
Phase 2	$20
Phase 3 *incl. energy recovery*	$90
Phase 4	$8

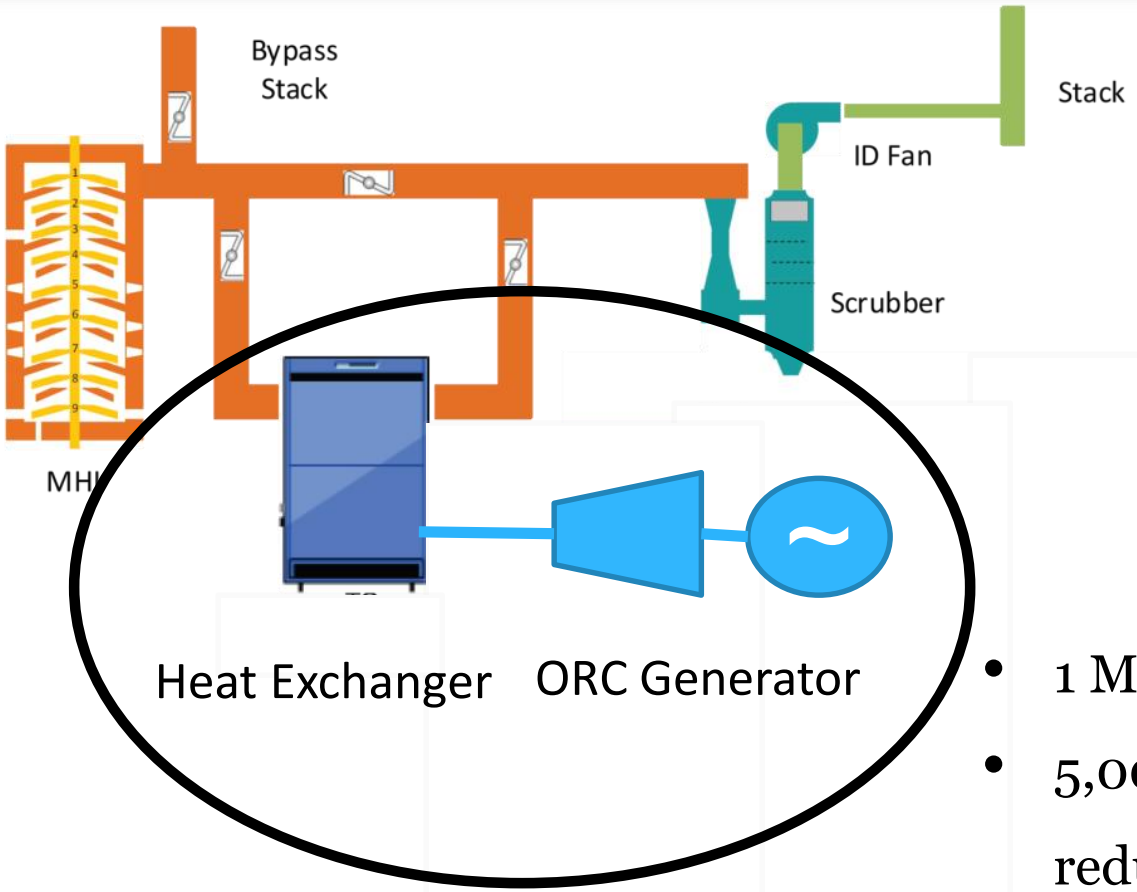


Noman Cole Plant met the new Clean Air Act Maximum Achievable Control Technology Standards in 2016

Status

Status

Energy Recovery Portion



- 1 MW Renewable Energy
- 5,000 metric tons GHG reduction
- Equivalent to 1,000 homes

Upcoming Public Notice Possibilities

- State DEQ –
- County Planning Commission and Site Permitting

Status

- Early projects nearly complete
- Clean Air Act MACT requirements met
- Major projects proceeding
- Energy recover portion in limbo
  - No DEQ response on new source trigger
  - Therefore proceeding with whole project but holding energy recovery as an bid alternate
  - If or when becomes viable, will review w/ BOS for endorsement before proceeding
- State & Local Public Notices Forthcoming

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